

Awareness about Emerging Trends of Robotics in Accounting: An Empirical Research

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Abstract

In the era of automation, the methods of recording and analysing business transactions are becoming automated, thus leading to the emergence of various disruptive technologies in the field of accounting. Robotic accounting is one such technology. The daily, repetitive data are automated using Bot software. In the present research, an attempt has been made to study the awareness about the use of robotic process automation (RPA) in accounting. The sample selected for the study consists of students, academicians, accountants, entrepreneurs, and auditors. The research analysed how this disruptive technology affects the work of accountants. Cronbach's alpha test was applied to test the consistency of the items. Factor analysis was done to identify the factors that affect the use of robotics accounting. Factor analysis extracted three major components. The chi-square test was applied to measure the relationship between the respondents' understanding of robotic process automation in accounting and their demographics. From the results, it can be inferred that the respondents' understanding of robotic process automation in accounting differs significantly with respect to their gender, age, qualification, and profession.

Keywords: Robotics Accounting, Robotic Process Automation, RPA Software, Exploratory Factor Analysis, Chi-Square

data analytics, Internet of things, artificial intelligence, and so on. In turn, the methods of recording and analysing business transactions are changing. Traditional or tally accounting is transforming into automated accounting. The monotonous, repetitive data are being automatically recorded with the latest software. The process of using automated applications (SAP, Blue Prism, UiPath) in accounting is known as robotics process automation (RPA). The daily, repetitive data are automated using Bot software. The RPA software are efficient, cost-effective, user-friendly, time-saving, and error-free. The software is similar to Excel, but has potential beyond Excel. Thus, RPA refers to configuring software to do the work previously done by humans, in a more efficient and accurate way. On the basis of the survey of ICAI in India, RPA has been used by several large organisations and in financial functions. In large organisations, automated loading of data can reduce sub-ledger cycle time, and with centralised operation, the operating cost can be reduced. In addition, automation can help in invoice reconciliation, which is highly intensive and prone to errors if done manually. The report observed that with automation, the audit will be done in a more efficient way, and auditors can provide clients a better, error-free, and faster service. Furthermore, automation will increase the efficiency of accountants. Besides, RPA can be helpful in direct and indirect tax assessment. In India, RPA has great potential, and by using the software, value-added services can be delivered efficiently.

Introduction

In the era of automation, various disruptive technologies have emerged in the field of accounting, such as robotics accounting, cloud accounting, block chain accounting, big

Review of Literature

The purpose of this review is to understand the concept of disruptive technologies with reference to robotic

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accounting. A summary of the previous studies would be helpful to understand the concept.

- Lauren Cooper (2018) investigated the adoption and use of robotic process automation (RPA) software, often referred to as bots, in the public accounting industry. Accounting firms use RPA software to automate the input, processing, and output of data across computer applications, in order to streamline repetitive and mundane business processes. They identified and discussed the potential benefits, opportunities, and challenges of implementing RPA in the accounting profession.
- Dahlia Fernandez (2018) studied the impact of robotic process automation (RPA) on global accounting services (GAS) using the institutional logic lens. The author used an in-depth case study approach in one of the largest global business services firms that provides global accounting services. The study showed that RPA technology has a significant impact on the individual and organisations, resulting in a change and reduction in work, thus decreasing the number of employees. Nevertheless, the introduction of new technology in an organisation creates unnecessary competition between humans and robots. Although RPA technology could solve issues involving humans, such as disciplinary problems, employee productivity, and human resource shortages, higher level of work, such as analytical aspects, can only be done by humans.
- Severin Lemaignan (2016) identified individual and collaborative cognitive skills: geometric reasoning and situation assessment based on perspective-taking, and affordance analysis; acquisition and representation of knowledge models for multiple agents (humans and robots, with their specificities); situated, natural, and multi-modal dialogue; human-aware task planning; and human-robot joint task achievement. Each of these abilities were analysed and presented as working implementations, explaining how they combine in a coherent and original deliberative architecture for human-robot interaction.
- Karippur Nanda Kumar (2018) focused on factors influencing customer experience in retail banking services delivered by RPA. The study theorises the

role of various factors influencing the adoption of RPA in the retail banking industry, and highlighted factors such as security, privacy, reliability, and usefulness as significant in advancing RPA in the retail banking industry. Implications for research and practice are also discussed.

- Somayya Madakam (2019) discovered that robots and robotic process automation technologies are becoming compulsory to conduct business operations in organisations across the globe. Robotic process automation can bring immediate value to the core business processes, including employee payroll, employee status changes, recruitment and onboarding, accounts receivable and payable, invoice processing, inventory management, report creation, software installations, data migration, vendor onboarding, and so on, to name a few. Besides, robotic process automation has abundant applications in various sectors, including healthcare and pharmaceuticals, financial services, outsourcing, retail, telecom, energy and utilities, real estate, FMCG, and so on.
- Marianne Chrisos (2018) focused on how robotics can help the finance and accounting industries. The author studied how robotics will impact finance and accounting. The study suggested that increasingly, robotic process automation or RPA has been considered a beneficial addition to the areas of accounting and finance. These industries and departments are often highly regulated and require a great attention to detail. Because of these factors, namely, the need for reduced errors and quick output to meet the needs of clients, as well as the rules of regulation, the sectors of accounting and finance lend themselves well to the influence and assistance of robotics, especially automation.

Research Gap

After a study of the existing literature, it was found that very less work has been done on the awareness of robotic accounting software and their use in accounting. This study is an attempt to study the factors which influence enterprises to move towards the adoption of RPA in accounting.

Objectives

The present study is based on the following objectives.

- To study the respondents' opinion of robotic accounting.
- To find out various reasons for adopting and not adopting robotic process automation in accounting.
- To explore the factors affecting the use of robotics accounting.
- To study if respondents' understanding of robotic process automation in accounting is indifferent, with respect to their demographics.

Hypothesis

Present research proposed to test the following hypothesis.

H_0 : Respondents' understanding of robotic process automation in accounting is indifferent, with respect to their demographics.

Data and Methodology

This study is descriptive in nature. The study is based on primary data collected through a close-ended structured questionnaire. The respondents of the present study were students, academicians, accountants, entrepreneurs, and auditors in the city of Udaipur. Non-probability purposive sampling technique has been used for data collection. The hypothesis was tested with the help of various statistical techniques, viz., statistical descriptive analysis, factor analysis, and chi-square.

Data Analysis and Interpretation

Reliability of Data Collection Instrument

Researchers commonly use the Cronbach's alpha coefficient for establishing scale reliability. The Cronbach's

alpha coefficient is an indicator of internal consistency of the scale. A value of Cronbach's alpha above 0.60 can be used as a reasonable test of scale reliability. The reliability results for the questionnaire are presented in Tables 1 and 2.

Table 1: Case Processing Summary

		<i>N</i>	%
Cases	Valid	156	100.0
	Excludeda	0	.0
	Total	156	100.0

a. List-wise deletion based on all variables in the procedure.

Table 2: Reliability Statistics

<i>Dimensions</i>	<i>Number of Items</i>	<i>Cronbach's Alpha</i>
Advantages of Robotics Accounting	5	0.614
Limitations of Robotics Accounting	5	0.621
Approaches to Robotics Accounting	20	0.871

Table 2 shows that the value of the Cronbach's alpha ranges from 0.614 to 0.871. As suggested by previous researchers, an acceptable level of reliability for psychometric test starts from 0.60. This indicates a good internal consistency of the items in the scale.

Demographic Profile of Respondents

Descriptive statistics are illustrated in Table 3, which indicates demographic-wise distribution of respondents. About 51.92% respondents are male and the remaining ($N = 75$, Percentage = 48.08) are female. A majority of the respondents belong to the age group 30 to 40 years ($N = 57$, Percentage = 36.54), followed by respondents in the age group 20 to 30 years ($N = 39$, Percentage = 25). It was observed that a majority of the respondents ($N = 45$, Percentage = 28.85) held a Ph.D. and most of them ($N = 51$, Percentage = 48.57) have work experience of more than ten years.

Table 3: Demographic Profile of Respondents

<i>Gender</i>	<i>N</i>	<i>Percentage</i>	<i>Qualification</i>	<i>N</i>	<i>Percentage</i>
Male	81	51.92	Degree	33	21.15
Female	75	48.08	Graduate	15	9.62
Total	156	100	Post Graduate	18	11.54
Age (In Years)	N	Percentage	PhD	45	28.85
Below 20	18	11.54	CA/CS	39	25.00
20 to 30	39	25.00	Other	6	3.85
30 to 40	57	36.54	Total	156	100
40 to 50	33	21.15	Work Status	N	Percentage
Above 50	9	5.77	Working	105	67.31
Total	156	100.00	Student	51	32.69
Profession	N	Percentage	Total	156	100
Academician	42	26.92	Years of Experience	N	Percentage
Accountant	9	5.77	Less than 5 Years	33	31.43
Auditor	36	23.08	5 to 10 Years	21	20.00
Entrepreneur	18	11.54	More than 10 Years	51	48.57
Student	51	32.69	Total	105	100.00
Total	156	100			

Respondents' Opinion of Robotics Accounting

A majority of respondents (N = 90, Percentage = 57.69) indicated that they understand robotic process automation in accounting. About 57.69% respondents (N = 90) opined that robotics accounting will replace accountants, while 30.77% respondents (N = 48) believe that it may or may not happen. The respondents

were asked if they had heard about the applications of robotics in accounting; it was found that a majority of the respondents (N = 78, Percentage = 50) had heard about SAP, followed by UiPath (N = 36, Percentage = 23.08), and Blue Prism (N = 27, Percentage = 17.31). Around 30.77% respondents (N = 48) indicated that they had not heard about any of the automation applications of robotics in accounting.

Table 4: Technology Trends of Future

<i>Understand Robotic Process Automation in Accounting</i>	<i>N</i>	<i>Percentage</i>
Yes	90	57.69
No	66	42.31
Total	156	100
Robotics accounting will replace accountants	N	Percentage
Yes	90	57.69
No	18	11.54
Maybe	48	30.77
Total	156	100
Heard about the automation applications of robotics in accounting	N	Percentage
UiPath	36	23.08
Blue Prism	27	17.31
SAP	78	50.00
Cathy	9	5.77
Others	3	1.92
Not Heard	48	30.77

Advantages of Robotics Accounting

Respondents were asked to indicate the advantages of robotics accounting. The results received are presented in Table 5. According to the results, the major advantage of robotics accounting is multiple-tasking (Mean = 3.94,

Rank = 1), followed by consistency and reduced error (Mean = 3.85, Rank = 2), and non-stop performance (Mean = 3.62, Rank = 3). The last two ranked advantages of robotics accounting were cost saving (Mean = 1.98, Rank = 4) and lower employee turnover (Mean = 1.62, Rank = 5).

Table 5: Advantages of Robotics Accounting

<i>Weight</i>	5	4	3	2	1	<i>Total</i>	<i>Weighted Total</i>	<i>Weighted Average</i>	<i>Rank</i>
<i>Rank</i>	1	2	3	4	5				
<i>Advantages</i>									
Non-stop performance	36	48	57	6	9	156	564	3.62	3
Multiple tasking	54	60	24	15	3	156	615	3.94	1
Consistency and reduced error	60	27	54	15	0	156	600	3.85	2
Cost saving	6	12	12	69	57	156	309	1.98	4
Lower employee turnover	0	9	9	51	87	156	252	1.62	5

Limitations of Robotics Accounting

Table 6 presents the limitations of robotics accounting. According to respondents' opinion, the major limitation of robotics accounting is that it is expensive (Mean =

3.44). Other limitations were security concerns (Mean = 3.37, Rank = 2), threat to accountants' jobs (Mean = 3.13, Rank = 3), lack of technical knowledge (Mean = 2.56, Rank = 4), and non-readability electronic data (Mean = 2.50, Rank = 5).

Table 6: Limitations of Robotics Accounting

<i>Weight</i>	5	4	3	2	1	<i>Total</i>	<i>Weighted Total</i>	<i>Weighted Average</i>	<i>Rank</i>
<i>Rank</i>	1	2	3	4	5				
<i>Limitations</i>									
Cannot read non-electronic data	30	27	3	27	69	156	390	2.50	5
Security concerns	39	30	51	21	15	156	525	3.37	2
Lack of technical knowledge	6	18	57	51	24	156	399	2.56	4
Expensive	39	51	18	36	12	156	537	3.44	1
Threat to accountants' jobs	42	30	27	21	36	156	489	3.13	3

Major Factors Affecting the Use of Robotics Accounting

Respondents were asked to indicate main concerns in their approach to robotics accounting. To reduce the number of variables in terms of relatively few new categories, factor

analysis is performed. These new categories are termed as factors, which also indicate the percentage of variance explained. The results are presented in Table 7. The results show that the total variance explained is 60.291%. This is appropriate for factor analysis. The 60.291% variance is explained by three extracted components.

Table 7: Total Variance Explained

Component	Total Variance Explained					
	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.817	39.087	39.087	7.817	39.087	39.087
2	2.612	13.062	52.149	2.612	13.062	52.149
3	1.628	8.142	60.291	1.628	8.142	60.291
4	1.206	6.029	66.32			
5	1.041	5.204	71.524			
6	0.923	4.616	76.141			
7	0.862	4.309	80.45			
8	0.745	3.726	84.176			
9	0.63	3.149	87.325			
10	0.537	2.685	90.01			
11	0.448	2.24	92.25			
12	0.344	1.721	93.972			
13	0.304	1.518	95.49			
14	0.228	1.139	96.629			
15	0.2	0.999	97.628			
16	0.141	0.705	98.333			
17	0.133	0.665	98.998			
18	0.093	0.465	99.463			
19	0.072	0.359	99.822			
20	0.036	0.178	100			

The most important tool in interpreting factors is factor rotation. The term rotation means the reference axes of the factors are turned about the origin until some other position has been reached. Factor rotation assists in the interpretation of the factors by simplifying the structure through maximising significant loadings of a variable on a single factor.

Table 8 explains that factor analysis has grouped the 20 variables into three factors. Factor 1 has 14 variables, factor 2 has five, and factor 3 has only one variable.

Table 8: Rotated Component Matrix

Component	Factor		
	1	2	3
1	0.569		
2	0.824		
3	0.555		
4		0.582	

Component	Factor		
	1	2	3
5		0.636	
6		0.544	
7		0.629	
8	0.514		
9	0.73		
10	0.74		
11	0.915		
12	0.555		
13	0.77		
14		0.564	
15	0.739		
16	0.632		
17			0.448
18	0.821		
19	0.817		
20	0.796		

Extraction Method: Principal Component Analysis;
Rotation Method: Varimax with Kaiser Normalisation.

On the basis of loading of the variables, the extracted factors are explained in Table 9. Based on the nature of the maximum number of variables included in factors, they are renamed as shown in Table 9.

Table 9: Factors Extracted

Factor	Variable	Loading
Factor 1 (Easy and Efficient)	Easy to use	0.569
	Improves accuracy	0.824
	Improves efficiency	0.555
	Improves productivity	0.514
	Scalability and expertise	0.73
	Fewer errors	0.74
	Independent auditing and testing	0.915
	High predictability	0.555
	Flexibility	0.77
	More informed decision making	0.739
	Saves time	0.632
	Better control	0.821
	Better account and bank reconciliation	0.817
	Better financial review	0.796
Factor 2 (Better control)	Reduces overall cost	0.582
	Reduction in monotonous work	0.636
	Cost saving	0.544
	Skill up-gradation of employees	0.629
	Beneficial in controlling human resources	0.564
Factor 3 (Better customer services)	Better customer services	0.448

Factor 1 (Easy and Efficient)

This factor is responsible for 39.087% variance of the total variance. Fourteen variables are grouped in this factor; they

are related to the benefits of robotics accounting, i.e. easy to use, improves accuracy, improves efficiency, improves productivity, scalability and expertise, fewer errors, independent auditing and testing, high predictability, flexibility, more informed decision making, saves time, better control, better account and bank reconciliation, and better financial review.

Factor 2 (Better Control)

This factor explains 13.062% variance of the total variance. Four variables, which indicate the benefits in terms of cost and increase in efficiency of human resources, are grouped under this factor. The variables include reduces overall cost, reduction in monotonous work, cost saving, skill up-gradation of employees, and beneficial in controlling human resources.

Factor 3 (Better Customer Services)

This factor is responsible for 8.142% variance of the total variance. It has only a single variable, i.e. better customer services.

Hypothesis Testing

H_0 Respondents' understanding of robotic process automation in accounting is indifferent, with respect to their demographics.

H_1 Respondents' understanding of robotic process automation in accounting is significantly different, with respect to their demographics.

To measure the relationship between the respondents' understanding of robotic process automation in accounting and their demographics, chi-square test is applied. The results are presented in Table 10.

Table 10: Chi-Square Test Results to Measure Relationship between Respondents' Understanding of Robotic Process Automation in Accounting and their Demographics

Demographic		Understanding		Total	Calculated Value	p-Value	Result
		Yes	No				
Gender	Male	39	42	81	6.288	0.012	Significant
	Female	51	24	75			
Total		90	66	156			
Age	Below 20	0	18	18	47.612	0.000	Significant
	20 to 30	24	15	39			
	30 to 40	39	18	57			
	40 to 50	27	6	33			
	Above 50	0	9	9			
Total		90	66	156			
Qualification	Degree	18	15	33	36.758	0.000	Significant
	Graduate	0	15	15			
	Postgraduate	6	12	18			
	PhD	30	15	45			
	CA/CS	30	9	39			
	Other	6	0	6			
Total		90	66	156			
Profession	Academician	18	24	42	18.244	0.001	Significant
	Accountant	3	6	9			
	Auditor	27	9	36			
	Entrepreneur	6	12	18			
	Student	36	15	51			
Total		90	66	156			
Experience	Less than 5 Years	21	12	33	4.343	0.227	Not Significant
	5 to 10 Years	15	6	21			
	More than 10 Years	18	33	51			
Total		54	51	105			

Level of Significance = 5%

From the results, it can be inferred that the respondents' understanding of robotic process automation in accounting is significantly different, with respect to their gender, age, qualification, and profession, while their understanding of robotic process automation in accounting is significantly indifferent, with respect to their experience.

Conclusion

The present study attempted to study the application of robotic process automation in accounting. The respondents for the study were from different fields of accounting. The researchers attempted to study the effect of disruptive

technology in the field of accounting. It was found that most of the respondents understand the phenomenon of RPA in accounting. However, many respondents felt that robotic accounting would replace the accountants. In addition, it was found that RPA is a cost- and time-saving process, resulting in error-free accounting. Factor analysis was done to analyse the factors for which RPA should be used in accounting. It was found that RPA will make accounting easy and accountants more efficient, management will have better control, the monotony of the work will be reduced, and the financial statements will be error-free. Chi-square test was applied to measure the relationship between respondents' understanding

of robotic process automation in accounting and their demographics. It was found that their understanding is significantly different, with gender, age, qualification, and profession. Thus, it can be concluded that RPA is an emerging technology, and to increase its implementation in the field of accounting, organisations should enhance the skills of accountants and auditors to prepare them for this emerging technology. To conclude, RPA will not replace the accountants. It will, however, improve their skills and make them more efficient, helping them to serve their client and organisation in a more effective way.

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